

REMARKS

Claims 1-18 are presently pending in the application. By this amendment, claims 1 and 11 have been amended. Reconsideration is respectfully requested.

The Examiner has rejected the Applicant's claims under 35 U.S.C. §1.03 in view of Acero (U.S. Patent NO. 6,141,644) and Kuhn ("Eigenvoices for Speaker Adaptation").

As the Examiner has noted, the Acero reference discusses a system where the speaker dependent portion is represented as a centroid, with the speaker independent portion being represented as an offset from that centroid.

Acero discusses essentially two options. In one option, a single training speaker is used to define the centroid. In the other option, two centroids are provided: a male speaker centroid and a female speaker centroid. The Acero reference is primarily involved with describing how the offsets may be developed and used.

In contrast with the Acero approach, the Applicant's invention defines the centroids by constructing an eigenspace from the training speech data obtained from a plurality of training speakers. The Applicant's eigenspace thus represents a *population* of speakers into which an individual speaker can be readily mapped. The eigenspace so constructed represents a low-dimensional space generally having one dimension for each of the training speakers (although it is possible to truncate the set by discarding some of the higher order dimensions). The n-dimensional eigenspace embeds a rich collection of information about the speaking characteristics of the population of training speakers, allowing the system to represent a diverse range of speaking characteristics as centroids within the eigenspace.

This is quite different from the considerably more crude technique employed by Acero, where speakers are simply lumped into two categories: male and female. Because the Acero centroids are so crude in comparison, Acero must devote considerable effort to manipulating the speaker independent offsets from those centroids. Conversely stated, the Applicant's invention employs a very rich eigenspace model by which the speaker dependent centroids are represented. Thus, the speaker independent offsets can be used to concentrate on more subtle speaker independent qualities.

In order to more fully distinguish the Applicant's invention from Acero, the independent claims have been amended to recite that the Applicant's low-dimensional space is developed by constructing an eigenspace from said training speech data. To the extent Acero's male and female centroids might be viewed by the Examiner as a low-dimensional space, it is clear that Acero does not teach or suggest developing a low-dimensional space by constructing an eigenspace from training speech data obtained from a plurality of training speakers. While the Kuhn reference describes the use of an eigenspace for speaker adaptation, there is nothing in the Kuhn reference to suggest that the eigenspace concept would be applicable in a system when speaker variability is broken down into speaker dependent centroids and speaker independent offsets from those centroids. In short, there is nothing in Acero to teach or suggest that it should be combined with Kuhn; and there is nothing in Kuhn to teach or suggest it should be combined with Acero.

Because the art does not teach or suggest use of an eigenspace to represent speaker dependent components as centroids within that space, it is respectfully

submitted that the Applicant's claims are allowable. Accordingly, allowance is courteously solicited at this time.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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